Procedures and Guidelines

DIRECTIVE NO. 573-PG-8700.3.1
EFFECTIVE DATE: 08/26/1998
EXPIRATION DATE: 08/26/2003

APPROVED BY Signature: original signed by
NAME: John Deily
TITLE: Branch Head

Responsible Office: 570/Guidance, Navigation, and Control Center

Title: GN&C Component Verification Testing

PURPOSE

This procedure establishes guidelines for the verification testing of Guidance, Navigation, and Control (GN&C) Components for space flight use. Employees will use this process in support of the design, analysis, verification, and review of Goddard Space Flight Center (GSFC) products.

REFERENCE

GPG 8730.4 The GSFC Quality Manual
GPG 8700.1 Design Planning and Interface Management
GPG 8700.2 Design Development and Configuration Control
GPG 8700.3 Design Validation
GPG 8700.4 Technical Review Program
GPG 5330.1 In-Process & Final Inspection and Test
GPG 5900.1 Control of Customer-Supplied Product
GEVS-SE General Environmental Verification Requirements

SCOPE

This procedure defines guidelines for verification testing activities of space flight GN&C Component Team members in the Applied Engineering and Technology Directorate (AETD) as well as any other members providing verification testing support to GSFC projects covered by the scope of the GSFC Quality Management System.

DEFINITIONS

Verification Tests - are intended to demonstrate flight worthiness of each component, demonstrate acceptable performance over the specified range of the mission requirements, measure performance parameters, and reveal inadequacies in manufacturing and assembly such as workmanship or material problems.

Verification Test Plan - completely defines all tests to be performed on the component in accordance with the component specification.

Verification Test Procedures - step-by-step instructions on how to perform the tests outlined in the Verification Test Plan.

AUTHORITIES AND RESPONSIBILITIES

Guidance, Navigation, and Control Center (GNCC) Employees

All GNCC employees are responsible for adherence to this procedure.

Product Design Lead (PDL)

Since many steps of this procedure are noted as being optional, it is the responsibility of the PDL, in partnership with the customer, to determine and document in the verification test plan which specific steps will be executed. Furthermore, guidelines contained herein may be waived at the discretion of the PDL and the customer due to extenuating circumstances such as limitations on time and/or resources, or by customer request. Such waivers must be documented.

IMPLEMENTATION

Note: All procedure steps are the responsibility of the Product Design Lead unless stated otherwise.

Requirements Definition

Generate/agree on verification test requirements with the customer as defined and/or derived in the Component Specification Document.

Initial Planning

The PDL ensures that the Product Development Team (PDT) is composed of individuals, both civil servants and contractors, with the required discipline skills.

Identify high-risk items and develop a risk mitigation plan (optional, per design plan).

Develop a budget and a schedule for review and approval by functional management and the customer (optional, per design).

Verification Test Plan

Develop a Verification Test Plan (VTP) that defines all tests to be performed on the component, states the purpose of each test, states acceptance criteria, describes the test methods and instrumentation, and gives the sequence of the tests.

The VTP shall include performance test plans, interface verification test plans, and environmental test plans.

Performance test plans involve either real environment tests or simulated environment tests.

Interface verification shall include both electrical and mechanical interfaces. Verification tests can include software simulations to replicate interfaces, analysis, hardware spacecraft simulators, and/or lab instrumentation.

Environmental tests include, but are not limited to, thermal, vacuum, thermal vacuum, EMI/EMC, structural, and radiation tests.

Include a test matrix summarizing all tests (optional, per design).

Define key personnel and facilities, with particular attention paid to facilities that may be constrained resources or only available at subcontractor's facilities (optional, per design).

Verification Test Procedures

Develop Verification Test Procedures that are step-by-step instructions on how to perform each test defined in the VTP.

The procedures shall define the environmental conditions for the tests, required equipment and facilities, test constraints, tolerances on all input stimuli, and limits on the output performance (optional, per design).

Reviews

The Verification Test Plans and Procedures shall be reviewed and approved by the PDL and/or other PDT members as designated by the PDL.
Any changes made to the Verification Test Plan or Verification Test Procedures after approval by the PDL require written approval of the PDL.

Verification Testing

Perform verification testing on the component in accordance with the Verification Test Plan

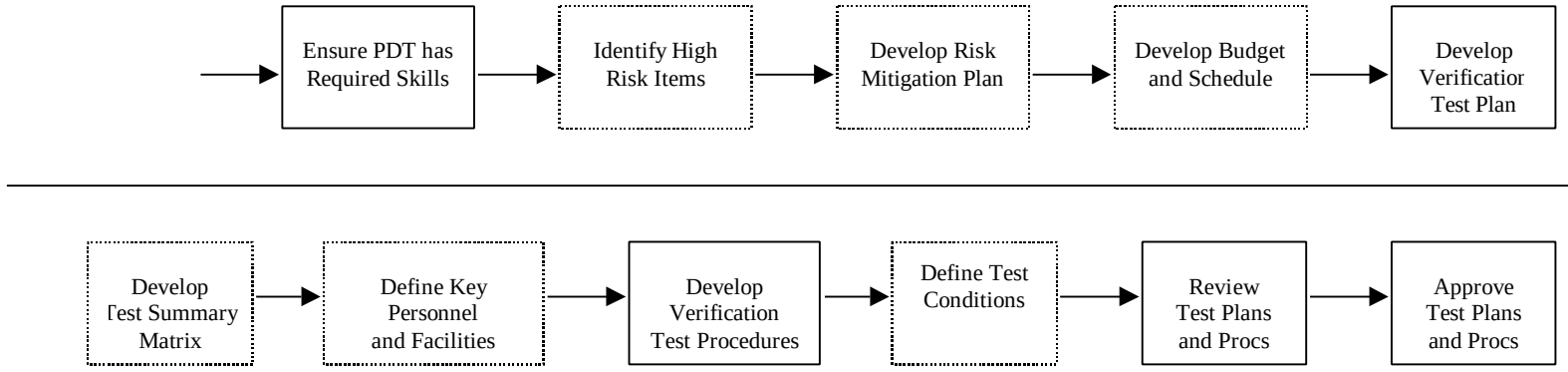
Final Development

Review and approve verification test data to insure compliance with the component specification requirements.

FLOW DIAGRAM

The GN&C Component Verification Testing Flow Diagram is shown on the following page.

Component Verification Testing Flow Diagram



CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	08/26/1998	Initial Release